FUGITIVE COLORATION OF TEXTILES

Haimont Hagara, Censon, S. C., assignor to Deerling Milleken Research Trust, Pendleton, S. C., a nonprofit trust of Maine

No Drawing. Application December 6, 1950.
Serial No. 199,547

6 Claims. (Cl. 8—56)

1. This invention relates to the fugitive tinting or coloration of textiles, more particularly those based on nylon, polyacrylonitrile, dyestuffs, and other synthetic fibers, including those which are wholly or partly acrylic polymers, or esters, but excluding the cellulosic textile materials containing cellulose or cellulose derivatives. The invention is also applicable to textile yarns based on blends of wool with such non-cellulosic synthetic fibers.

Fugitive coloration of nylon, in particular, presents special problems since the tinted yarn, or fabric woven or knitted therefrom, is subjected to a heat-setting treatment, usually with steam. This heat-setting treatment tends to fix the tinting dye more or less permanently in the fibers so that the yarns remain stained or colored, and the tint cannot be removed readily in later finishing operations, e. g., the scouring bath. Special reducing or oxidizing treatments to remove the tint are accordingly required. The above, as well as other factors, affect the fugitivity of dyes or tint on nylon or other yarn subjected to heat-setting. Accordingly, it cannot be predicted with certainty which dyes will be suitable for the fugitive tinting of such fibers.

In accordance with the present invention, it has been found that alkaline aqueous solutions of p-nitrophenol are highly suitable for fugitive tinting of wool, of non-cellulosic synthetic fibers such as nylon, polyacrylonitrile (Orlon), terephthalic acid ethylene glycol polymer (Fiber V) and partially acrylic fibers (Dyneal and Chemstrand) and of blends of wool with such synthetic fibers. Thus, for example, a solution such as is obtained by dissolving p-nitrophenol in an aqueous sodium hydroxide solution, whereby the p-nitrophenol is converted into the sodium salt thereof, will fugitively color nylon a bright yellow, which, even after a steam-setting of the tinted yarn spun therefrom, can be removed, cleanly and completely, in a soap and water bath. Any color which does not come out in the scouring bath, does so upon treatment of the tinted material with an acidic solution, such as dilute sulfuric acid, hydrochloric acid or acetic acid. The acid media convert the yellow p-nitrophenol sodium salt to p-nitrophenol which is colorless.

A separate acid treatment to remove residual color is not required in the case of mixtures containing wool which are to be passed through a carbonizing apparatus since the acid employed in the carbonizing processing renders any residual tint colorless.

Instead of preparing an alkaline solution of the p-nitrophenol by dissolving p-nitrophenol in so-

2. ...
2,683,647

1.02 grams of sodium hydroxide
5.92 grams of Triton X-100 (an alkylarylpoly-
ether wetting agent)
1172.5 grams of water.

The solution has a pH of about 11 and is suf-
cient to tint 50 pounds of nylon staple. It is
applied to the nylon staple by spraying. In the
case of nylon yarn, the solution is applied by
passing the yarn therethrough or over a wick ap-
pli cator.

Example 2

A solution is made up of:

3.55 grams of sodium p-nitrophenolate
5.92 grams of Triton X-100, and
1173.5 grams of water.

The tinting solution has a pH of about 11 and
is applied in the same manner as described in
Example 1.

Example 3

In the case of tinting non-cellulosic synthetic
fiber-blends or all wool stock, the pH of the tint-
ing solution should not be over about 8 to avoid
the possibility of alkaline damage to the wool.
Such tinting solutions are prepared from the so-
lutions described in Examples 1 and 2 by adding
there to sufficient sodium bicarbonate to reduce
the pH to about 8. In the case of wool-synthetic
fiber blends, the tinting solutions of about pH
8 are applied dropwise onto a roving of the blends,
conveniently at the pin drifter. In the case of
100 per cent wool stock, tinting solutions are
applied preferably by spraying.

It will be understood that the usual pene-
trants, lubricants, and sizings may be included in
the tinting bath. The concentration of the so-
dium p-nitrophenolate may be varied over wide
limits. Usually about a 0.3 per cent solution is
sufficient to provide sufficient tinting coloration.

The following is claimed:
1. A process for the fugitive tinting of organic
non-cellulosic textile materials for purposes of
identification during textile operations wherein
the tint is capable by scouring of complete re-
moval without residual staining, which process
comprises subjecting the textile materials to an
aqueous solution containing sodium p-nitro-
phenolate.

2. A process as in claim 1 wherein nylon is
tinted.

3. A process as in claim 1 wherein a mixed
nylon-wool textile is tinted.

4. A process in accordance with claim 1 in
which the concentration of the sodium p-nitro-
phenolate in the solution is about at least 0.3%.

5. A process for fugitive tinting of textile ma-
terials for purposes of identification during tex-
tile operations wherein the tint is capable by
scouring of complete removal without residual
staining which process comprises dissolving p-
nitrophenol in an aqueous solvent containing so-
dium hydroxide, and tinting an organic non-
cellulosic textile material with the resulting yel-
low colored solution.

6. A process as in claim 5 wherein nylon is
tinted.

References Cited in the file of this patent

UNITED STATES PATENTS

<table>
<thead>
<tr>
<th>Number</th>
<th>Name</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,341,433</td>
<td>Chalin</td>
<td>Feb. 8, 1944</td>
</tr>
</tbody>
</table>

FOREIGN PATENTS

<table>
<thead>
<tr>
<th>Number</th>
<th>Country</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>553,442</td>
<td>Great Britain</td>
<td>May 21, 1943</td>
</tr>
</tbody>
</table>

OTHER REFERENCES

Rowe's "Colour Index," published by Society
1, 1, 2, 2.

"Organic Dyestuffs," by A. Wahl, translated by
Atack, published in London, 1914, by G. Bell &
Sons, pages 85, 86, 87.

Amer. Dyestuff Reporter for July 30, 1945,
page 304.
Silk Jour. and Rayon World for August 1945,
p. 33.